

AMERICAN JOURNAL OF PHOTOGRAPHY

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PRINT COMPETITION

WE are glad to note an increased interest in our Print Competition and that most of the prints offered are of a high order of excellence.

CLOSING DATES

CLASS

- No. 1. Closed,.....Water pictures (not seascapes).
- No. 2. Closed,.....Landscapes.
- No. 3. Closed,.....Animal pictures.
- No. 4. October 20th,....Seascapes.
- No. 5. Nov. 20th, Interiors.

All subscribers to the AMERICAN JOURNAL OF PHOTOGRAPHY are eligible in the competition. The decision as to the merits of the pictures will be made by an acknowledged authority on technical photography, and also by two well-known artists.

The criticisms of the awarded pictures will be published in the AMERICAN JOURNAL OF PHOTOGRAPHY.

THE AWARDS

1st,.....	Ten Dollars	(\$10.00)
2nd,.....	Five "	(\$5.00)
3rd,.....	Three "	(\$3.00)

RULES AND CONDITIONS

All prints must be mounted, with the name of the competitor written on the back of the card. Title may be placed on front.

The number of prints submitted in each class shall not exceed two for any one sender.

No prints previously awarded prizes will be admitted.

Each contestant must be a subscriber to the AMERICAN JOURNAL OF PHOTOGRAPHY. Subscription may accompany the entry of the prints.

Prints must be sent fully postpaid.

When the sender desires the return of prints, stamps must be enclosed: otherwise the prints will not be returned.

Awards will be made in each case on the 15th of the month following entry.

AWARDS FOR WATER PICTURES

- "A Day in June,".....Charles H. Carroll, Elmira, N. Y.
 "Cobb's Creek,".....Wm H. Ingram, Phila., Pa.
 "Ohio Canal,".....E. C. Hrabak, Cleveland, Ohio.

AWARDS FOR LANDSCAPES

None.

AWARDS FOR ANIMAL PICTURES

- "Kingfisher,".....Wm. L. Baily, Ardmore, Pa.
 "A California Thoroughbred,"
 W. H. Hill, Pasadena, Cal.
 "Three of a Kind,".....L. H. Hutchins, Pasadena, Cal.

REPORT OF COMMITTEE ON PRIZE PICTURES

YOUR Committee find a number of photographs of animals which have been submitted to them for their decision, amongst which are many of much merit. They have accordingly in their judgment awarded the

First Prize to WM. L. BAILY,

whose picture of a kingfisher shows not only skill in selection but also technical excellence of the highest grade.

The Second Prize to W. H. HILL, whose photograph also evinces taste and judgment.

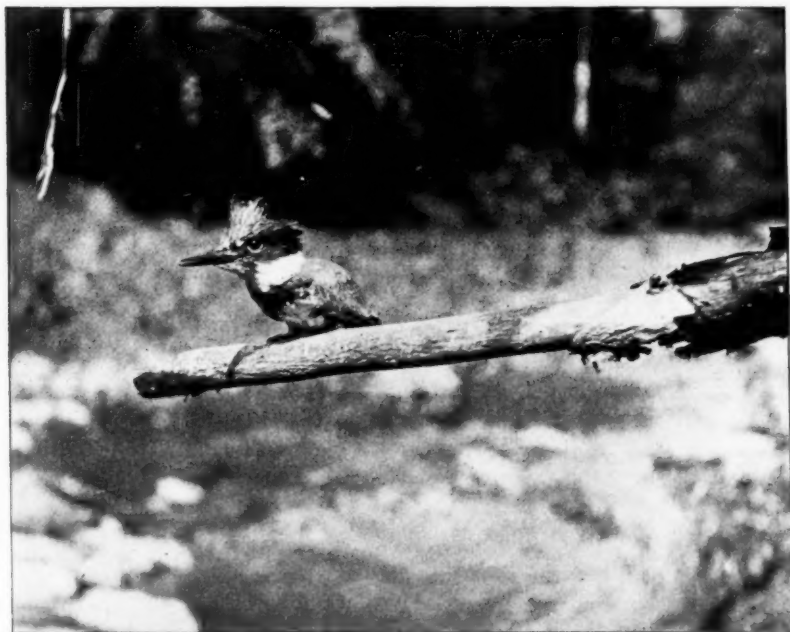
The Third Prize has been given to L. H. HUTCHINS.

WILLIAM H. RAU,

A. J. COSTELLO,

HENRY P. OSBORNE.

Phila., September 28th, 1899.

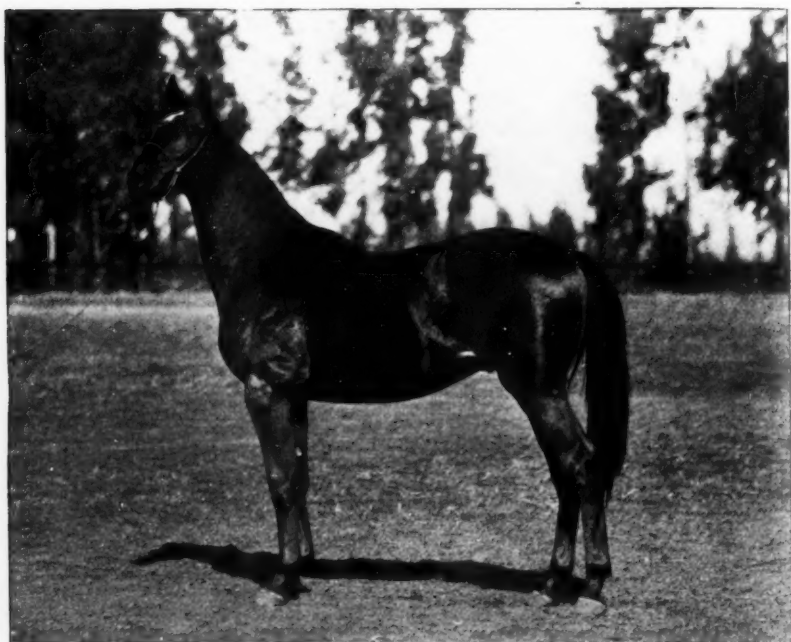


Kingfisher

WM. L. BAILY

SELECTION OF SUBJECT

THE inventive faculty is of the greatest importance to the photographer in search of the picturesque be he a portraitist or a landscape photographer. But all of us are not "born great," and though in photography, none of us ever has "greatness thrust upon him," yet we may in a measure



A California Thoroughbred—2 years

W. H. HILL

"achieve greatness," at least to a degree that may admit of our products hanging in the salons. So *nil desperandum*, let us make the effort.

Though originality is a congenital gift, yet it is possible to cultivate the inventive faculty by observation.

Hogarth, describing his own mode of life, says: "Be where I would while my eyes were open I was continually at my studies and acquiring something useful to my profession." Stothard's

sketch books were filled with groups of figures and scenery made without any special selection, but merely what chance offered to his notice while travelling ; sometimes objects which the window of an inn presented while horses were changing, and sometimes what he saw from the top of a stage coach. No doubt Stothard would, if living now, be an enthusiastic snap-shot photographer of the right sort.

Though one may not be gifted by nature with the faculty of



Three of a Kind

L. H. HUTCHINS

artistic selection, yet study, both from nature and from the works of the painters, may enable him to produce something beautiful.

Sir Joshua Reynolds says, "Nothing is denied to well-directed labor, nothing is to be obtained without it."—The ideal of selection is generally to be preferred to the ideal of our own—and the ideal of selection is engendered by a careful study and close observation of the immediate objects which present themselves to us even within a confined limit.

It has been well said, that the constant inhabitant of a village may learn more of mankind, if he be a close and just observer, than he whose life is spent in roaming over the world, if he observes not carefully, and above all, if he studies not himself.

It is not likely that Shakespeare ever got much further in his travels than London, or a little way over the Welsh border.

Selection and combination are the principles on which invention must work, and originality, after all, is the power to see commonplace objects under a poetic aspect. Burns turned up a mouse with his plough, but he made that mouse immortal.

Rembrandt painted barns and commonplace people, but they still delight the world.

Oberon and Titania are the veriest man and wife that ever existed, but at the same time the most exquisitely poetic conceptions.

Thomas Bewick, though not a painter, was an artist of the highest order *in his way*.

The woodcuts which illustrate his books of natural history may be studied with great advantage by those who are ambitious of achieving success in original composition.

His conceptions are full of the truest feelings for nature though only representing the most ordinary objects.

His vignettes abound in scenes and incidents from real life, diversified by genuine humor and often with pathos.

Leslie in speaking of his work says, "There is often in the apparent trivial little things which he makes use of, a deep meaning that places his art on a level with styles which the world is apt to consider greatly above it, in proof of which I would mention the party of boys playing at soldiers among graves and mounted on a row of upright tombstones for horses; while for quaint humor, extracted from a very simple source, may be noticed a procession of geese which have just waddled through a stream, while their line of march is continued by a row of stepping-stones."

The student of landscape may always consult the works of Bewick, and derive great assistance therefrom in the study of composition.

The backgrounds to the figures of his quadrupeds and birds and his vignettes have a charm of nature quite his own. He gives us in these, every season of the year, and his trees,

whether in the clothing of summer, or in the nakedness of winter, are the trees of an artist bred in the country. Trees remarkable either for the lightness or grace which characterize some varieties, the fullness which marks others in the vigor of maturity, or for the picturesque ruggedness of decay.

He is equally true in his little home scenes, his farm-yards and cottages, as in his wild coast scenery, with flocks of sea-birds wheeling round the rocks.

In one of these subjects there stands a ruined church towards which the sea has encroached, the rising tide threatening to submerge a tombstone raised "to perpetuate the memory of," etc.

Wilkie's subjects, from familiar and rustic life, are amongst his best works, such for instance as the "Village Politicians," "The Blind Fiddler," "Rent Day," "Duncan Grey," etc.

Among his charming productions representing scenes from domestic life are, "The Penny Wedding," and "Distraint for Rent."

The "Penny Wedding" has been compared with Burn's poem, the "Hallow'en."

ERROR CORRECTED

WE regret to say that an error was made in giving the title to one of the views illustrating Mr. W. N. Jennings' interesting paper on "Snap-Shot Street Scenes in London," contributed to our September number.

Mr. Jennings informs us, he did not live two years in London without learning to distinguish a Recruiting Sergeant from an English Bobby, which later title was inadvertently given.

The proper title should be "The Spider and the Fly."

PHOTOGRAPHING THE TRANSIT OF VENUS IN 1874

WILLIAM H. RAU

IT may be necessary, for the benefit of some of your readers, to briefly explain what a transit of Venus is, and why it is so important to make careful observation of it, that governments like England, France, and the United States fit out at great expense expeditions which sail to far dis-



The Camp on Whangaroa Bay, and U. S. S. Swatara

WM. H. RAU

tant parts of the globe, for the sole purpose of registering the results of a phenomenon, which occupies but a few hours in duration.

The transit of Venus is the passage of the planet Venus across the disk of the sun, where it appears as a small black ball, against the sun's luminous disk.

The object of observing the transit is to accurately determine the distance of the sun from our earth, which distance is, as you know, the measuring line for determining the distance of the planets and fixed stars.

Of course astronomers had methods of approximately finding



Transit House, Showing Chronometers and Chronographs

WM. H. RAU

out the distance of the sun, but it was not till 1677, that Halley suggested the means by observing the transit of Venus. Venus had already been seen crossing the sun by Horrox, in 1639, but the next transit did not take place till 1761, and then Halley's suggestion was acted upon, as well as in 1769. The next transit did not occur until 1874, in the photography of which the

writer of this paper had an opportunity of assisting. It being the first transit at which photography was called into service, it may be of interest even to those who assisted at the subsequent transit, 1882.

The next transits will occur in 2004 and 2012, but it is probable before that time that astronomical science will have discovered



Surveying Whangaroa Bay

WM H. RAU

other methods of determination of the sun's distance, not requiring such long journeys, the expenditure of so much money, as well as the combined labor of the principal governments of the world.

Venus is nearer the sun than we are ; now, when she passes

exactly between the sun and the earth, two observers placed at two extremities of our globe do not see it projected on the same point of the sun and the difference of the two points leads to the knowledge of the angle which gives the sun's distance.

It was for this purpose that expeditions were sent to the extremities of the earth to make observations.

The English and French Governments sent out a number of expeditions. The United States dispatched eight parties in 1874. Three were sent to the Northern Hemisphere and five to the Southern Hemisphere, all in the eastern part of the Globe.

The Southern Expedition, consisting of five sections, sailed from New York, June 8th, 1874, in the U. S. S. *Swatara*, stopping at Bahia, in Brazil, thence to Cape Town, South Africa.

The first party was to be located at Crozet Island, 2500 miles S. E. of Cape of Good Hope, as the most favorable spot, but as it was impossible to land, it was taken to Campbell Town, Tasmania. The second party was landed at Kergeulan Island, or Desolation Land.

The third party was carried to Hobart Town, in Tasmania. The Fourth to New Zealand, at Bluff Harbor.

The fifth party, to which we belonged, landed at Chatham Island, entering Whangaroa Bay, the only port capable of accommodating our ship, October 19th. Our party consisted of Edward S. Smith, of U. S. Coast Survey, chief, Albert H. Scott, assistant, Sumner Taintor, mechanical expert, and Mr. Buehler and myself, the photographers.

We encamped on the rocky shore upon the domain of the owner of a sheep ranch; the raising of sheep and wool being the chief industry of the land. Our habitation included seven tents, sleeping rooms, parlor, dining room, store room, kitchen and toilet room.

Our observatory was set up on a hill about 500 yards back of the camp, which we named Venus Hill, in honor of the planet whose photograph we were about to take.

Our readers will remember that the modern gelatine dry plate was not then in existence, and we could not furnish ourselves with a stock of Carbutt, Cramer, or other desirable surfaces for exposure, but had to make our plates right on the spot.

Our plates were of thin extra quality plate glass coated with albumen while dry, and not wet, as was the practice at that time.

Sheep Ranch—Natives in Foreground

WM. H. RAU



Cabin Built of Wrecked Whaler "Alabama"

WM. H. RAU

They were then flowed with the collodion, dipped in the silver bath and exposed while still wet.

The object of dry coating with albumen was to lessen the risk of expansion of the film, as the measurements required are so minute that the breadth of a hair difference would make considerable difference in results.

The first point of contact of the planet occurred between one and two o'clock, the transit ending about 6 P. M. Every plate was numbered by a mark with a diamond in the corner and placed in grooved boxes.

Four silver baths were employed, one man coating the plates while another placed them in the holder, and after the exposure was made the plate was at once developed and fixed.

This operation was continued with the regularity of clock work. During the photographing our chief

likewise was making with the equatorial 5 inch objective instrument, his observations on the hill.

We had considerable difficulty in carrying our water from a well which was at some distance from the hill. We called into service for our bath, etc., a barrel of distilled water which we had from the ship.

Our apparatus was set up in a dark house constructed for the purpose, as will be seen in the photograph. The image of the sun was photographed without the intervention of an enlarging lens. The telescope was placed horizontally and the rays reflected into the object glass by a mirror suitably mounted and regulated by clockwork, so as to keep the sun's image stationary during exposure. The image was a little over four inches in diameter. Just in front of the sensitive plate, which was fixed to a specially constructed plate-holder, was placed a plate of glass ruled in squares, with a mark in the centre. Between this and the collodion plate hung a fine wire of silver, suspending a plumb-bob. In this manner the finished negative was marked into squares and also showed the image of the plumb-line, indicating exactly the position of the vertical.

The photographic telescope was exactly in line with a meridian instrument, and so determined with the utmost precision the direction in which it was pointed.

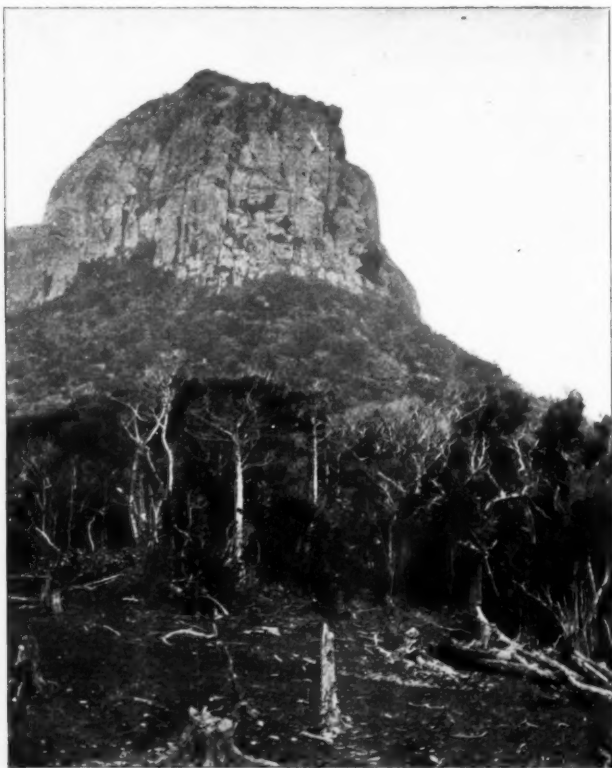
Knowing this, and the time any picture was taken, it was possible with the help of the plumb-line image to exactly determine the orientation of the photograph.

The data obtained from these observations have not, as far as we are aware, been published. The English photographic results are the only ones which have yet appeared.

The day the ship left us on the island and went back to Hobart Town, a fire broke out in our camp from the accidental ignition of a wax match, but fortunately, the valuable apparatus in the tent where the fire originated, had been removed. We were supplied with provisions for a year, not expecting to find that English colonization had made considerable progress in the country.

The English settlers assured us of the harmless character of the natives, though they had been but recently reclaimed from cannibalism. We became acquainted with a Moravian missionary, who has done much good work amongst the natives. The natives

are the Moriori and the Maori tribes, and we received frequent friendly visits from them after the completion of our observations. For, from the time of our landing up to the beginning of serious work, everything in the camp was conducted with military discipline, and the whole company was daily subjected to drill, so



Maunganui (Big Mountain)

WM. H. RAU

that at the critical moment there might be no danger to the results from want of discipline.

We made a few excursions over the island and saw traces of recent cannibalism in the remains of human bones.

In one of our visits to our neighbors, we saw the curious mountain shown in our photograph, called Maunganui, or Big Moun-

tain. It is about 900 feet high and is probably of volcanic origin.

The vegetation is considerably stunted. Its growth is no doubt checked by the constant wind which never stops blowing. Indeed we had to devise certain means to prevent it interfering with our observation and while photographing.

Our sojourn was during the summer. The winter must convert the place into a dreary waste.

We were picked up by the U. S. S. Swatara, Jan. 6th, 1875; stopping at New Zealand and then at Hobart Town, thence at Melbourne. The Swatara left us here and continued her voyage around Cape Horn, carrying with her the apparatus and results of the observations; but we sailed on the Pacific mail steamer by way of Fiji, the Samoan and Hawaiian Islands to San Francisco, coming home by the Central & Union Pacific R. R.; the whole voyage occupying very nearly a year.

WHERE TO LOOK ON THE GROUND GLASS



BEGINNER in photographic composition is almost sure to look at the center of the ground glass, when he has his head under the focussing cloth, and considers it the point of greatest attraction in selection of subject, but if he shall take the trouble to examine the works of Turner, Fortuny and in fact the masters in landscape painting, he will discover, that the centre very rarely has any special attraction; frequently it is quite bald. It does not follow, to be sure, that the middle of the scene should never have any beauties to attract at once the eye to it, but it does follow, that it is apt to be the weakest part of the picture and a dangerous ground for the novice to build on.

In viewing the objects upon the focussing screen, we are apt to view them in outline only, instead of as masses of light and shade. Really there is no outline, strictly speaking, in nature or in representation of nature through the medium of the lens, but only masses of varying intensity.

A person's face, for instance, with which we are familiar, is seen and recognized by its features; unless we are artists we do not take into account the lights and shades upon it. We do not see that ridge of light running down the forehead, nose and chin, and when the experienced portraitist points it out to us, it is a revela-

tion. So it is with a tree in the woods. It is a flat distinct object against a flat background of the sky, having an irregular hard well-defined outline, simply because we look at the tree isolated, divorcing it from its harmony with the surroundings.

How different objects, which we think definite and distinct, having as it were to our conception almost a wire-like outline, blend and soften one into the other when we do not specially look at them for line, but as patches of light and shade!

Then they become something more than silhouettes.

The tree against the sky, when we have come to see it in its true relation to surrounding objects, whether seen directly or upon the ground glass of our camera, not as a spot full of detail whereon to focus, but as light and shade, will be found to be full of these patches of light and shadow. Wherever a hollow space is left by the branches, there is deep shadow, and where the branches reach out beyond the others, there the patch will be brightest. The most commonplace object, which seems at first glance to have furnished us with all its effect, is capable, by the magic influence of light, of being transformed "into something far more rare and strange." To the artistic eye, there is nothing common or unclean in nature. All things are capable of being modulated by diversities of light and shade.

There is always a point of high light and an opposite point of deep shadow and picture making is the maintenance of the just relation between the light and the shade.

In looking on the ground glass our attention should not be directed to any one part to the exclusion of the others. Each object, in order to be put in proper relation with the rest, must have its due proportion of light and shade. The light must be proportional throughout the scene. It is just the same relation in the distribution of light and shade in a composition which must be observed to produce effect, as is analogously maintained in a musical composition. The relationship of the notes in the scale must be maintained, no matter what the key may be.

In a photograph, where the light key is allowed to be pitched high, unless the shadow is equal to it in quantity, the effect is garish in the extreme. Corot delighted in brilliancy of light, but he knew how to balance it with shadow.

Murillo and Rembrandt, though they make use of a great deal of heavy shadow, always set it off with the contrast of high light.

It too often happens that the imitator of the so-called salon picture imagines that he approaches the domain of the great in his pictorial attempts, by smudging over the intense high light and producing an even tone-like effect. When looking on the ground glass screen, see that the point from which the light comes is maintained throughout the scene. There should be only one point from which the illumination should come, but there should be a centre of light in the picture itself from which all the other lights radiate and decrease until they are lost in shadow.

Of course it is not always possible in photographing from nature, to so manage the lights and shadows that there may be a central point of strongest light (not central in the picture (understand) but central as regards the radiation of the other lights): though it may not be always possible we should seek to secure such effect whenever the conditions are controllable.

Intense light, both in painting and in photography, are difficult to reproduce upon a plane surface. Nevertheless, many an intense high light in a photograph is condemned by the artist as harsh and inartistic, which really is truer to nature than in the painting of many first-class painters. Gérôme and other French painters and some of the Spanish painters reproduce the effect of light most wonderfully, especially reflected light from bright surfaces, but a majority of the German, English and Americans, produce reflected light by dabs of white lead and chrome yellow: and likewise the deep shadows in photographs are unjustly criticised. In nature shadows are generally much darker than the objects casting them when the light is strong.

But it may be argued that effective photographic pictures are never produced in strong sun-light. An argument, which by the way, has no value whatever. It may be more difficult to maintain the harmony of a picture by strong light and there is danger of having too great contrast. But let us look at some of the paintings of gardens, lawn and meadows by the Spanish and French painters, especially some of the tropical scenes. We shall find that they give the shadows so dark that one at first questions their taste, and is inclined to look upon them as falsities, so accustomed are we to look at nature only through pictures instead of face to face.

The intense light, as well as the intense shadow is there, but the harmony of relations is still preserved and the beauty of the

pictures grows more and more apparent, the more carefully and critically we study them. Mere studio painters of landscape look "askance and doubting," at brilliant photographs with intense high lights and deep shadows, and accordingly hold up as models for imitation to the photographer in search of the picturesque, pictures in which the outlines of the shadows are conscientiously blurred and softened. But the truth is, even where in nature the object itself is softened or blurred by atmosphere, the shadow is not so affected.

My title to this paper, was I believe, about how to look or where to look on the ground glass, but I am afraid I have been talking a good deal about light and shade. Still I think it is germane to the title, since the picture upon the ground glass ought to be studied for the massing effect of light and shade, and it would not be a bad idea to emphasize the values in the picture by purposely obliterating the detail in the subject, by throwing the scene slightly out of focus. Not that I believe that judicious observance of detail in the finished picture interferes in the least with our degree of artistic enjoyment, if the values are properly maintained, but too much attention during the process of composition to detail might mask discords of light and shade.

In conclusion I wish that the photographer may derive some ideas from my paper, and if I have not given him any tangible conception of what to observe when his head is under the focusing cloth, I trust this last word of advice may atone for the expense of time he has suffered in reading it, that is, to take advantage of the modern discovery of the value of a well-conceived complex foreground, not to imagine that a foreground may be made by drafting into service any old thing; a bit of rock, a branch of tree or what not, to serve, as they say, to preserve the balance of the picture. All such objects if not in harmony with the scene, both in character and in the variations of light and shade and diversity of tones, are meaningless rubbish, offensive to the artistic eye and detract from the value of the composition. The foregrounds in nature are generally very complex, and our best landscape painters have only recently found out how very important this complexity is. I am not altogether in line with the impressionist school, but that school has taught us that nature has not a patch so big as a man's hand which is not in itself full of rich gradation of light and shade. Study conscientiously the foreground, when you have your head under the cloth.

KRÖMSKÖP COLOR PHOTOGRAPHY

AT the Photographic Society, on September 27th, Mr. Frederic Ives lectured on "Krömsköp Color Photography," and for the first time in this country exhibited and demonstrated his perfected system and apparatus. Even since his return from London, Mr. Ives has made some important improvements and taken out new patents. Krömsköps were shown with all the latest improvements, and one entirely new camera for making three exposures simultaneously. "Multiple Back" camera attachments for making the negatives by successive exposures on one plate, and a "lantern Krömsköp," both of which have been placed upon the market in England, were also shown, with new improvements, and a demonstration of the completeness and practical efficiency of the system was afforded by the exhibition of reproductions of a great variety of subjects.

After touching upon the subject of color as an element in pictorial representation, and the pleasures to be derived from the cultivation of the color sense, the lecturer pointed out that the solution of the problem of photography in the colors of nature had been sought through two quite distinct lines of investigation,—the first and long favorite one being chemical experiment, which had never succeeded in its object, and the second, the application of physical principles, on the basis of which definite successes had finally been achieved. In this connection, we quote as follows :

"Although in such a form as to limit its application, we have to-day at least one really and practically successful method of photography, a method of realizing the condition specified by Isidore Niepce, that of yielding reproductions which look like a reflection of the object itself in a mirror ; but the means by which this result is obtained is so far outside of any thought of Niepce's, that if he were alive to-day, I doubt if he would call it color photography at all. According to the early searchers for a method of color photography, and to thousands of people of kindred mind to-day, nothing short of the production of pigment colors by the direct action of light upon the sensitive surface should be classed as color photography. It is true, no reason could be given for such attempts as were made to discover such a process

except the hope that such a process might be discovered. There was no scientific basis for the methods which were tried, and the search was an almost perfect parallel to the search of the ancient alchemists for the philosopher's stone. Nevertheless, the love of mystery and the belief in miracles is so strongly implanted in the human mind that the blind efforts of the modern alchemists have been followed with interest and evergreen hope, while rational methods of attacking the problem have been belittled and discredited. It is well to bear in mind that very few of the great problems that engage the human mind are solved along the lines of procedure originally conceived. Nearly half a century ago, an ingenious mechanic devoted the best years of his life to devising a high and complicated machine to speak, in imitation of the human voice, when its keys, like the keys of a musical instrument, were suitably manipulated, and he did not succeed; but Edison, by the discovery, or the invention, of a totally different and far simpler principle and device, pointed the way to the successful reproduction of the human voice. It is so with color photography. Niepce de St. Victor sought by elaborate and fantastic combinations of mineral salts to find a combination which should respond to all the colors of light by the formation of correspondingly colored pigments. His theory is so peculiar and interesting, and so characteristic of the earlier attempts to discover a process of color photography, that I must describe it to you, as it was published in a photographic text-book, nearly half a century ago. Niepce thought that an analogy might exist between the color given to flame by certain salts and the color produced upon specially prepared Daguerreotype plates. In the Daguerrotype process, when chloride of sodium was employed, producing chloride of silver, it was found by Becquerel that this chloride was differently colored by different spectrum rays. The explanation has since been found to be that the blue rays reduced the silver in a very finely divided state, while the red rays oxidized it. Niepce imagined that if chloride of strontium, which colors a flame red, were to be substituted for the chloride of sodium, it should reproduce the reds; by the same reasoning, that the use of chloride of calcium, or uranium, should reproduce the yellows, chloride of nickel the green, double chloride of copper and ammonium the blues, and chloride of strontium with sulphate of copper the violet; and that chlorides which will not color a

flame should reproduce only black and white. Now, the fact is, that whatever chloride is used, the product is merely chloride of silver and soluble salts which have practically nothing to do with the coloration,—and Niepce's theory, although calculated to attract the enthusiastic admiration of such people as, ten years ago were convinced by the luminous explanations given by one Keely, of Philadelphia, had no sound basis in reason. So shallow was Niepce's observation that he quite overlooked the fact that chloride of sodium colors a flame a pure yellow, yet produced plates which were colored brick red by the pure red spectrum rays, and dull blue by the blue and violet rays, but persisted in showing only a dirty gray where yellow should be; so that his theory was experimentally disproved before it was even conceived. Both Becquerel and Niepce obtained colored pictures on chloride of silver Daguerrotype plates for the reason I have already stated, that the blue rays reduce the silver in a finely divided state, and the red rays oxidize it, the two products being different in color. There may have been also a trace of the action characteristic of the Lippmann process, which, however, depends upon a physical principle, which was quite outside of their thoughts.

"Very important discoveries, often half accidental, have been made by such visionaries as Niepce, but there are problems which can never be solved by mere discovery, but call for the exercise of inventive genius. It often happens that we have at hand all the natural means requisite to the solution of an important problem a generation or more before there arises a man who sees the relation of the means to the end sought, and by such scientific application and combination of the natural means at hand as constitutes an act of invention, achieves a solution of the problem. This was true of the steam engine, the phonograph, the telephone, and in the light of recent developments it appears to be equally true of color photography.

"Admitting that it is so, it follows that to an eminent English scientist, Prof. James Clark-Maxwell, belongs the credit of the first rational suggestion in the direction of color photography. At the beginning of the century, Prof. Thomas Young promulgated the theory that there are three fundamental color sensations, which are red, green, and blue or violet. Half a century later, Young's discredited and almost forgotten theory, was revived and ably supported by the German scientist Helmholtz.

Soon after, it was still more ably supported by Prof. Clark-Maxwell, who proved experimentally the possibility of reproducing to the eye the sensation of all other colors by the mixture of the red, green and blue spectrum rays, and reduced the method to one of simple arithmetic. But Clark-Maxwell at once thought of a possible application of this fact which proved him to be an inventor as well as a scientific discoverer. He said, in effect, if there are only three fundamental colors, should it not be possible to make three photographs to represent these fundamentals, and then to optically blend them to form a single image which should constitute a photographic reproduction of all the colors of objects? He not only made this suggestion public, but, in a crude way, demonstrated the principle in illustrating a lecture at the Royal Institution, in London, in May, 1861.

"So little impression did this suggestion make that it appears to have been immediately forgotten by everybody. Four years after, a similar suggestion was made by another Englishman, Henry Collen, and by an Austrian, Baron Raoult, who both extended the idea to the production of color prints. These suggestions were also forgotten. In 1868, Ducos Du Hauron, in France, took out a patent for this principle, with red, yellow and blue as his primary color and elaborated the idea in many and ingenious ways. Chas. Cros, in France, also claimed the idea, at about the same time. Thanks to Du Hauron and Cros' voluminous writings, and Du Hauron's attempts to reduce the method to practice, followed later on by similar efforts on the part of a younger brother, this idea was not again lost sight of, although it was never reduced to a scientific or practical basis by them, and nothing had been heard from them upon the subject for several years when a genuine success was achieved along similar lines by myself, in 1888. In fact, this idea had been so discredited by failures that there could not then be found anywhere a recognized authority in photographic science who would admit that it had or was ever likely to have, any practical value, and experiments along the old lines of Seebeck, Becquerel or Niepce were still industriously prosecuted. Reports of the success of my experiments in 1888, were received with incredulity abroad, but since they have been followed by ocular proof, and my theoretical exposition of the subject endorsed by eminent physicists, a great revival of interest and activity has developed along the line, until

the old method of experiment appears to have been altogether abandoned, and, with a single exception, all of the so-called processes of color photography of to-day are applications in one way or another of the trichromatic theory. And thus it is, that the term 'color photography' has come to be applied in a somewhat different and wider sense than was originally acceptable, and to include methods which, both in theory and practice, may actually reproduce the colors of objects."

The lecturer gave a description of the Lippmann process, showing a single example, and then, as a basis for his exposition of the trichromatic or "composite" processes of color photography, presented an experimental analysis of light and color, and an explanation, with illustrations, of the orthochromatic process. The original suggestion of trichromatic color photography, by Prof. James Clark-Maxwell, in 1861, the subsequent suggestions by Henry Collen and Baron Raoult, and the work of Ducos Du Hauron and Chas. Cros, dating from 1868, then received attention, and the history of the subject was carried up to 1888. Of the state of the science of composite color photography at this time, the lecturer said :

"The possibility of making photographs by the action of the red, yellow and green spectrum rays, as well as the blue and violet, had been discovered and demonstrated by Dr. Vogel, in 1873. A practical method of accomplishing such results in commercial photography had been realized by me in 1878, and published in 1878. Every material means requisite for the practical application of Prof. Clark-Maxwell's idea was then at hand, but between the years 1878 and 1888, very little was published upon this subject, and nothing encouraging, and the repeated failures of Du Hauron, Albert and others had led to the belief that only very crude and imperfect results could ever be expected by such a method. It is true that in 1885, Dr. Vogel published an alleged new principle, which, however, only indicated a new method of selecting printing colors, and was a wrong principle as applied to trichromatic photography. In all of the methods which had been carried out or even proposed previous to 1888, there was a fatal defect."

Coming now to his own methods, first published and demonstrated in 1888, the lecturer explained that it was based upon a strictly quantitative analysis of physiological color mixtures, as

originally made by Prof. Clarke-Maxwell, whose "color-curves" he declared to be almost perfect color-mixture curves, and to meet the practical requirements of a scientific system of trichromatic photography, although some refinement had recently been made upon them by Capt. Abney. Continuing, he said :

"Such a system of composite color photography, in its simplest form, consists in making three photographs of the objects, by mixtures of the spectrum colors acting as indicated by the three curves in Maxwell's diagram, and then projecting them upon a screen, each by light of the simple color which it represents and superimposing and blending the images, in accurate register so as to form a composite image." "The procedure, which was first published by me in 1888, involves two radical departures from all previous methods of carrying out the idea of trichromatic color photography. The first, is that of working to the color-mixture curves, measuring the action of the light rays in photographs of the spectrum, and thus securing a true quantitative color record, whereas previously there had been no more definite idea than that of exposing through 'orange, green, and violet,' or 'red, yellow and blue,' or 'red, green and blue' screens, all of which can be shown to be utterly indefinite since there are reds and reds, and green and greens, and so on ; and sensitive plates so different that they give almost totally different results with the same color screens.

"The second new idea was that of making all the visible rays act in making the color record, as I have just described, but then employing only three widely separated spectrum bands of color for the optical synthesis.

"Du Hauron, Cros,² and even Prof. Lippmann, in carrying out tri-chromatic experiments, employed the same screens for both photography and optical synthesis—a fatal mistake, even if the color screens had been adapted to secure a true color record. Even Prof. Clark-Maxwell, who, more than anybody else should have seen the futility of such a procedure, is *reported* to have done the same thing.

"No doubt much of this scientific and historical detail may seem tiresome to some, and my insistence upon the importance of such new elements as I introduced into the process may seem immodest. Fortunately for me, statements which were so regarded when I first made them, eleven years ago, have since been

indorsed by eminent scientists ; and such of my actions as at first provoked criticism and were made an excuse for disagreeable personalities, have since been commended as necessary acts in a fight to establish an important fact."

The application of the principles to the production of permanent color prints was then gone into very fully. It was shown that the correct "printing colors" are the complementary colors of the "primary" colors of light, and are not strictly "red, yellow and blue," but a kind of crimson pink, a particular shade of light yellow, and a greenish blue which might be described as cyan blue or light peacock blue. Incidentally, a half-tone process "three-color, print," made by the lecturer in 1881, the first print of the kind ever made, was exhibited, and was shown to anticipate by many years alleged patent rights which had been exploited by some largely capatilized joint-stock companies.

After describing the so-called Joly or MacDonough process, and Prof. Wood's process, the lecturer concluded by pointing out the peculiar merits of the Krömskōp system, which yields the most perfect results yet attained, by a simple and practical procedure. The Krömskōp, a neat table instrument which shows the pictures in color and in stereoscopic relief, was fully described, and many uses for it were suggested, in addition to its more obvious use as a means of drawing-room entertainment. An exhibition of results was given to the members and visitors at the close of the lecture.

The AMERICAN JOURNAL OF PHOTOGRAPHY continues to grow more interesting with each succeeding number. Its articles are thoughtful, well written, and always touch some point of practical utility, and Mr. Bartlett deserves praise for the amount of good, original (not reprinted) matter which he manages to offer every month.—*The Photo-Miniature*.

INSTANTANEOUS WORK AND SNAP-SHOT

J. C. WOOD.

THE term instantaneous is rather indefinite, but generally speaking, it is taken to designate exposures of less than a quarter of a second, while snap-shot is generally applied to exposures made as quickly as possible with a hand camera.

Such definitions may seem like distinction without difference.

In estimating what degree of exposure should be given, one must take into consideration what amount of movement of the object on the plate is allowable without causing blurring of the image.

The size of the image upon the plate must be regarded in considering the liability to blurring.

Where the degree of movement is the same, the larger the image the less the blurring.

The position of the camera with respect to the object affects the degree of represented motion. If the camera is placed so as to point not directly across the line of movement but at an angle with it, a longer exposure would be permissible without registering movement.

It is advisable to use the largest aperture, consistent with definition.

A lens of considerable covering power should be employed so as to obviate stopping down.

A good shutter is indispensable and, though their name is legion, there are very few worth anything.

Most of them with high speed cause vibration of the camera.

One great trouble with the instantaneous exposures is in getting the proper focus. The general practice is to focus on some point in the field of view where we expect the object to pass which it is our intention to photograph, then to set the shutter and draw the slide and wait till our victim arrives at the spot. But the chances are that even if our desired object does reach the spot selected, its position may not be just what we desire. If a runner for instance, he may just at that instance duck his head or raise his hand in some undesirable way.

The late Mr. J. Traill Taylor, some years ago recommended a plan of using a telescope in connection with the camera lens for photographing rapidly moving objects.

The point behind a lens at which the image of an object situated at any given distance in front will be sharply focussed, depends upon the focal length of the lens. This is self evident.

If therefore a telescope having an object glass of the same focal length as the camera lens employed, be fixed to the front of the camera, and an object focussed on the ground glass, and at the same time by the eye-piece of the telescope the eye-piece being then clamped to the frame which carries the ground-glass so that if the camera is racked in and out so as to focus another object in the telescope, the same object will be focussed on the ground glass.

Such an arrangement was recommended for photographing yachts at sea or other rapidly moving objects since the camera may be focussed for some object at the same distance as that at which it is proposed to take the exposure.

After focussing the telescope the slide may be drawn, the shutter being of course set. The object is now watched through the telescope and kept in focus by racking the camera in and out and the exposure made with absolute certainty that the object will be sharp.

When a tripod cannot be used for taking moving things it is necessary to have the camera of a size and weight convenient for handling. Focussing is done by having a fixed scale and the necessity of drawing the dark slide dispensed with since, under the circumstances, the necessity of the employment of two or three movements before exposure might endanger the chances of getting the object at all.

Snap-shot work is or has generally been looked upon as rather belonging to the province of the haphazard photographer, who is content to shoot at anything that comes along, no matter what—so it is going at a rapid gait. But recently most beautiful artistic results have been effected by those "who know what beauty is and see where it lies."

The lens is the great desideratum in selection of a hand camera, next to it the shutter and the means of rapidly changing the surface for exposure.

A rapid rectilinear lens with a clear focussing scale is to be preferred where a variety of work is sought after.

The shutter should be able to give exposure as much as $\frac{1}{100}$ of a second and should be capable of being set whilst the sensitive film is in position. A shutter released by a pneumatic bulb, is indispensable; those requiring to be pulled by a cord, however admirable for other purposes, are out of all question for hand cameras, inasmuch as the position of the camera is sure to be disturbed.

A finder is also indispensable and should exhibit exactly the amount of view as the lens gives upon the ground glass.

The finder is almost always placed on the top of the camera. This is not objectionable when the level is taken below the height of the eye, but when it is necessary to raise the camera above the level of the eye, one cannot possibly look on the finder when on top; arrangements might therefore be made for fastening it at the side near the bottom of the camera.

As regards the means of renewing the sensitive surface for exposure the modern appliances are very near perfection. The roll-holder film with its long lengths, the mechanism by which they may be easily and safely manipulated and the means of multiplying indefinitely the number of exposures by the day-light spools, is certainly a triumph of mechanical ingenuity.

SIMPLICITY IN ART

TRISTRAM J. ELLIS.

WE all know how strongly a single figure, or even a head, if well painted, with only a single toned background, will stand out in a gallery of miscellaneous paintings.

The others with their complicated masses of detail, seem poor and weak beside it.

Now, this is merely on account of the simplicity of the masses, resulting from the choice of a single figure with the plain background, which causes it to look stronger than the rest. If incidents be introduced into the background so as to render it full of small lights and shades of nearly equal strength or intensity to the figure, not only will the figure not stand out as it ought to do,

but the whole picture will be rendered weak ; in one word it will have lost its simplicity.

Not that it is requisite for a picture to be poor in detail in order to be artistically simple. Baldness is not simplicity. It is only necessary that the lights and darks should not compete with each other in force.

To make a good picture there should always be a highest point or place of light, and a greatest point or place of dark.

We here naturally recur to Rembrandt's pictures, which represent the climax of simplicity in art. See how any one of his portraits stands out from every other picture round it.

He always leads up to some central light on the forehead, and he never burdens his background with incidents.

In his subject pictures, and especially in his etchings, he works the greatest detail into the background, and everywhere else, but he keeps it all so low in tone that you have generally to look for it before you see it.

There are not to be found in his paintings or in nature any two shades or any two lights that are of the same strength, and thus we have variety as well as simplicity.

Study works by well-known French artists:—Laurens, Meissonnier, Bouguereau, Bonnat, or in landscape, Pelouse, Troyon, Corot, Daubigny, Allongé—and see how very simple their pictures are painted, and yet how full they are all over of detail and interest. There is always some central interest, to which everything is subservient, yet there is nothing forced ; it all looks natural.

Everything depends upon the choice of subject if you desire to secure this simple and natural effect.

Do not therefore *photograph* or paint something because you want to photograph or paint, but only when you have found such a good subject that you cannot resist. Keep your interest in your work. Directly that flags the work suffers. It follows then that if you cannot keep up your interest when studying art, you had better leave art alone, for to succeed, it is necessary to study much.

PRINTING METHODS

ELLERSLIE WALLACE.

THERE are many things that can be well and thoroughly learned only by means of some plan of study dealing with comparisons.

This is especially true of the various printing methods employed in modern photography.

The photographer has a wide choice of processes for the producing of the print from the negative. As chief amongst these we may name the ordinary albumen silver, the collodion and gelatine, aristos, the plain silver paper, the carbon, the varieties of bromide developable papers, and the platinum. The ferro-prussiate or blue print process, though adaptable to certain purposes, is not so generally useful as the former.

If asked to sum up the useful points of the different methods, we should still incline to the ordinary silver print as affording the greatest range of tone, the greatest ease of management, the most perfect and beautiful results, and, when properly handled, the least outlay of money. As regards this latter all-important point, it is evident that the bulk of the labor—the preparation of the paper being done by the photographer or his assistants and the prices of the material being low—the cost of the finished prints, particularly when made in quantity, will compare favorably with other processes where the paper has to be bought ready prepared at a high price, and where only too often there is no redress in case of failure and loss from causes for which the photographer himself is by no means responsible.

As there is a reverse side to everything, however, it may very possibly happen that seasons will arise when the labor and time of paid assistants must be economized to the uttermost, and when the quickness with which large numbers of prints can be turned off even in dull weather, by the aid of an article bought ready prepared, will more than make up for the high price at which the article has to be purchased.

We are not disposed to consume space in your journal in the consideration of these more strictly business points, for each photographer will necessarily regulate them for himself. Our province is rather to attempt to compare the values of the different printing processes we have mentioned in their proper photographic sense.

We have already alluded to the great range of tone afforded by the ordinary silver print, but it is even more extensive than many persons suppose, who think only of the conventional portraits of public and private individuals, and of the ordinary landscape and architectural studies seen in exhibitions. We shall only be reiterating the well-known saying among practical printers, when we remind our readers that the first factor of tone in the print is the character of the negative. A model printing negative will often afford prints which may be toned to any desired color, from the rich warm red—almost cherry-hue, through chocolate, sepias and browns to violet, then to pure black, and finally to a steel-blue-black just verging on ashiness. To produce such tones at will from such a negative, will require no little attention to detail. The strength of light in which the print is made has some influence.

A print, rapidly made in the full glare of sunlight, will rarely stand the combined action of the toning and fixing baths, as well as one that has been made more slowly in a more subdued light. Exceptions to this may sometimes be found in the case of negatives which have been over-developed or over-intensified, so that the brightest sun will be required to penetrate them and give a proper gradation of shades in the print.

A proper toning-bath must be selected, and the reddening which always takes place in the hypo-fixing-bath and the final wash-waters be noted and calculated for, as well as the remarkable return of color which occurs when the print is dried.

Beginners and inexperienced printers are apt to find their work over-toned to an ashy-blue tint; forgetting that the prints "dry up darker and bluer," they leave them too long in the gold-bath, so that they assume there the precise tone wished for in the finished print. They are delighted with the results before submitting the prints to the action of the hypo-bath, only to be disappointed when they emerge therefrom, for the washing, or they may not notice the disastrous effect wrought upon their lovely-toned print till examined after the washings.

But, on the other hand, when we consider that the production of a certain tone or color is really a matter that has to be calculated, and that requires thorough knowledge of the different solutions, it is little short of marvellous how perfectly regular tones can be made upon thousands of prints, even from different negatives, by an experienced man.

So much for the average silver-print as usually seen. But this is only the beginning.

Before the introduction of the bromide papers, it was customary to make enlarged prints on albumenized paper by means of special solar cameras fitted with powerful condensing lenses.

Excellent results were obtained, but the loss from uncertain light and bad weather was very great.

The beautiful tone of the albumen print was, however, preserved, and here we come to the great drawback and objection artistically to the bromide, either for contact work or enlargements—its limited range of tone. That the fine brilliant black of a well-timed and skillfully developed bromide print, is very pleasing and good, we do not deny. On the contrary, there are certain subjects and certain effects that will be better suited by this than by any other tone, but the point is that the bromide print, being produced by a process of development, has the main characteristics of developed prints i. e. less depth of shadow, with a tendency to veiling of the finer details in the darks. (We shall say nothing about the so-called bromide sepiatone.)

Among the greatest beauties of the bromide print are its delicacy and perfection of half-tone. Great evenness of quality is another. The most ardent advocates of the albumen print must have noticed the striking difference in behavior between the "thick" and the "thin" edges of the sheet; with the bromide papers there is no such drawback; there is perfect uniformity of tone, so that if the opposing corners of the sheet be bent over so as to touch no difference in the tone is perceptible. The difficulty of securing a range of tone, of any extent, with bromide is to be regretted. A point that will always be in favor of the bromide print is the ease with which it may be worked upon with the pencil or crayon and other retouching articles.

Interest has recently been revived in the old method of silver printing on plain paper, an article on the subject having been recently presented at the Photographic Society of Philadelphia.

Beautiful results can be produced by the plain paper, that is paper which has not been albumenized. It is a process easy to work and very economical, particularly in the consumption of gold.

The tones range from dull brick red to blue, and the prints are quite in line with the modern desire, being quite without gloss—and hence it will recommend itself to the makers of salon exhibits.

ACETONE IN THE DEVELOPER

Presented at the Celeron Convention of the P. A. of A.

MOST every monthly magazine has in it something to say on some new fad in the developer line, and the dark-room operator who has his regular brand of plates, and his developer that is giving him good satisfaction, has no time to monkey with every new idea that is brought to his notice, but the photographer of leisure and the amateur find their is a certain charm in trying a new brand of plates, a modification in the developer, or a new style of printing paper from that which he has been using, and sometimes comes across a little change, that works so successfully that his neighbor, the professional photographer, breaks through the rut and finds it an improvement, and it is by these little changes that we have moved onward from the commencement. The grist of our advancement has not been by the professional or commercial photographer, but by the man of science working out a theory, or amateur who delights in the muss of experimental work. I am a little fond of mussing in this way myself, and have been told that I would be much better off if I would have let somebody else have done it. This was, at any rate, an acknowledgement that somebody ought to do the mussing. If I had taken that advice years ago and kept it, I should still be working at buff and my silver bath to-day.

I write these few lines as a prelude or an excuse for the advocacy of a new developing agent introduced about a year ago; namely, Acetone.

It has, in my hands, shown a superiority over that of the carbonate of soda, or of potash; it being used in their stead. It is peculiar in its action. A solution of pyro and sulphite will not answer for a developer, a solution of pyro and acetone will not develop, but together, by the reaction of the acetone on the sulphite solution sets the developer at work. It does not soften the film nor cause it to frill, does not stain or fog under any ordinary conditions. I have used it for a year past in my stereoscopic and landscape work, also in lantern-slide work, with great satisfaction and feel warranted in recommending it highly. In the formula I give, I claim no originality. I give them as I used them. They can be modified by an increase of water, if the brand of plates or

subject works to hardness, or, on the other hand, the addition of a small quantity of a 10 per cent. solution of bromide of Potassium can be used if deemed necessary, in formula 1 and 3.

The sulphite of sodium I use is a saturated solution. I take, for instance, a pound bottle of sulphite and fill with water, and on shaking a few times, it soon becomes saturated, then keep the bottle always at least half full of crystals and full of water. I fancy it keeps its purity better in this shape, and certainly it is much more convenient to make up a small quantity of developer.

Four fluid ounces of saturated solution is equal to one of crystals. Never use water hotter than 90 degrees F. in dissolving the sulphite.

NO. 1.—PYRO.

Water,	.....	2 fluid ounces.
Saturated solution of Sulphite,	.....	2 fluid drachms.
Acetone,	.....	1 fluid drachm.
Dry Pyro,	.....	5 grains.

NO. 2.—METOL HYDROCHINONE.

a. Water,	.....	8 fluid ounces.
Metol,	.....	15 grains.

Dissolve and add :

Saturated solution Suphite,	.....	4 fluid ounces.
Hydrochinone (H. and F.),	.....	60 grains.
10% Bromide Potassium,	.....	1 fluid ounce.

b. Take of a,	.....	2 fluid ounces.
Acetone,	.....	1 fluid ounce.

NO. 3.—EIKO-HYDRO.

a. Water,	.....	8 fluid ounces.
Saturated solution Sulphite,	.....	4 fluid ounces.
Eikonogen,	.....	50 grains.
Hydrochinone,	.....	25 grains.
b. Of above,	.....	2 fluid ounces.
Acetone,	.....	1 fluid drachm.

No. 1 is especially good for transparencies and stereoscopic work ; No. 2, for Velox or strong negatives ; No. 3, for stereoscopic, landscape and portrait work. I am

Faternally yours,

Detroit, July 15th, 1899.

JOE BARDWELL.

TONING TROUBLES

WHAT Mr. Burton aptly describes as the battle of the toning baths still occupies the arena, and from reports received of the proceedings of the various photographic societies, and numerous queries and letters from our correspondents, it is abundantly evident that the subject of toning, whether with platinum or gold, still presents many difficulties and uncertainties. A few months ago we dealt exhaustively with the subject of toning baths, contrasting the ancient with the modern methods employed, and pointed out the causes which rendered changes necessary, and which made the older forms of toning unsuitable for the new and modern papers. A few further words confined to the causes of failure with modern makes of commercial papers might prove instructive to the large number who still meet with occasional difficulties and failure. As we previously pointed out, the principal difference between the albumenised or salted papers of the past and the gelatino-chloride of the present day consists in the comparatively small quantity of silver chloride and of silver nitrate in the uncombined state which exists in the latter as compared with the former. Again, there is the difference that the old papers were salted and sensitised by floating on a solution, whilst the modern papers are surface-coated with an emulsion consisting of silver chloride and an organic salt of silver instead of the free nitrate.

First, let us consider how gold acts upon the reduced silver in the print. It is, perhaps, as well to point out that the chloride of gold of commerce should properly be called auric acid, since its formula is AuCl_3HCl , or, more properly, HAuCl_4 , by which it will be seen that for each atom of gold deposited upon the print three atoms of chlorine are set free, and in its nascent condition unites with three atoms of the reduced silver of the printed image, reconverting it into silver chloride, and thus, in a large measure, undoing what the light has done. To prevent this, the addition of some salt, the acid of which is capable of being easily displaced by chlorine, is necessary. Hence the function of soda acetate, phosphate, or tungstate as employed in ordinary toning baths, is, first, to neutralize the HCl molecule of the gold chloride: and, second, to absorb or combine with the liberated

chlorine as the gold is deposited, thus preventing, in a great measure, the bleaching of the print.

It will be familiar to most photographic printers that with most of these baths the orthodox method was to mix at least twelve hours before using. The reason for this was because the HCl molecule of the auric acid is not immediately displaced by a neutral solution of an acetate or phosphate requiring some hours for completion. By carefully neutralising with a solution of carbonate of soda previous to mixing, however, this time was saved, and an acetate or other similar toning bath might be used at once. This method of toning was satisfactory with albumenised papers of all kinds, and with collodio-chloride or matt papers; but, with the advent of gelatine as a vehicle for containing the emulsion for surfacing the paper, fresh and new troubles were introduced. Old and tried formulæ refused to act. Either the prints would not tone at all, or toned very unevenly. Usually the fainter half tones and lighter printed portions toned rapidly to a cold blue, whilst the deep shadows remained red, and the so-called double toning took place.

We invariably hold as a maxim that, when the cause of any trouble is clearly understood, the remedy is obvious and the difficulty disappears. In this case the reason is of a twofold character. That this may be clearly understood, let us examine the action of gold chloride on gelatine. If we dissolve a few grains of gelatine in water, say, in a test tube, and add a few drops of the stock solution of gold chloride, the gelatine is at once gelatinised and becomes insoluble. Again, take a strip of dried gelatine and immerse in a solution of gold chloride, and no amount of after-washing will remove the gold, nor will boiling water dissolve the gelatine. The two have entered into some form of chemical combination, and an absolutely insoluble product is the result, just as if an excess of formalin had been added. It is easy to see, then, that with a gold-chloride toning bath and a gelatine-surface print, this combination will take place over the whole surface of the print, and the toning bath be robbed of its gold. Another factor of a different kind also comes into force, and is even more the cause of double tones than the one we have referred to. In albuminised papers the sensitising salt was usually the free nitrate of silver, with citric or other organic acid as a preservative. This, being soluble in water, was easily eliminated in

the washing previous to toning ; but in gelatine papers the whole of the silver nitrate is converted into the nearly insoluble organic salts of silver such as citrate or tartrate, and this, being intimately bound up within the gelatine of the film, is almost impossible of removal by washing. Returning now to another reaction of gold chloride, that upon salts of silver. If we take a solution of auric chloride and add to it carefully an exact equivalent of silver nitrate, we obtain a precipitate consisting of a mixture of aurous and argentic chloride. Two of the three atoms of chlorine go to form silver chloride, and the gold is reduced to the insoluble aurous state, or AuCl . This aurous chloride is exceedingly unstable, and easily suffers reduction to the metallic state, consequently toning takes place rapidly to the blue stage; but for reasons which we will now point out this is a decided disadvantage.

As was previously stated, the unexposed paper consists of a uniform and homogenous mixture of silver chloride and silver citrate, or other organic salt ; but when exposed and fully printed, this condition no longer exists. As the printing of the image progresses, the chlorine eliminated by the action of light from the

Photography of Colors

McDonough Method

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ONE NEGATIVE ❀❀❀
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silver chloride unites with the organic silver salt, to form further amount of silver chloride, which is itself again darkened, and so on until the necessary depth and vigor is obtained. It will be readily seen, therefore, that in the fully printed proof the whole of the free salt of silver may be used up in the deepest shadows, whilst the half-tones and lighter tints still contain a considerable quantity, and the whites the whole amount originally in the paper. If, now, this silver salt is not removed, or is unsufficiently removed, and a toning bath containing gold chloride be employed, the above reaction at once takes place, as precisely the same change takes place in the gold, whether organic or nitrate of silver be used. The gold chloride of the toning bath is precipitated as silver aurous chloride, not only on the partially printed portions, but in still larger quantities over the white or unexposed parts, whilst the shadows, which really require the most, receive least. At the same time, the toning bath is robbed of its gold, and rapidly becomes useless. The deduction from these facts is obvious: First, gold chloride is unsuitable for toning gelatine prints; and, second, we see the necessity of taking adequate measures for the total removal of the organic salts of silver previous to placing in the toning bath.

The first of these objects is satisfactorily attained by the use of gold sulphocyanide instead of the chloride. When gold chloride in solution is added to ammonium sulphocyanide solution, a deep red precipitate is first formed of gold sulphocyanide, and ammonium chloride remains in solution. On the application of a gentle heat this precipitate dissolves first as a red and then a colorless solution. This gold solution no longer combines with gelatine, and will mix freely with a solution of it without any apparent disturbance taking place.

The second object is attained by a preliminary bath of salt and water, which converts the whole of the citrate and tartrate into chloride of silver. A further wash in one or two changes of water now removes the resulting soda citrate or tartrate, and uniform, even toning is the result. The double salt of hyposulphite of soda and gold may be substituted for the corresponding sulphocyanide salt, and is, in fact, the active toning agent in what is termed the combined bath. But space forbids to go further into the subject at present. On this latter point we may have something to say at a future date.—*British Journal of Photography.*

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NOTES

Imitations of the Kromskop.—Mr. Frederic Ives, of Philadelphia, has only recently so far perfected his inventions in color photography as to bring the Krömskōp system commercially before the public,—yet already efforts are being made by others to appropriate some of the benefits of the Krömskōp's fame. The manufacturers of the "Kromaz" (London), imitate the name, appropriate the photographic process, copy original details of construction of special apparatus, and seek to make the public believe that they achieve the same results by simpler means, although their procedure demands the impossible feat of blending two primary colors perfectly through the two eyes. These pretensions are given prominence in periodical literature, without criticism or reproof, and many people who see the results are deceived into thinking that they represent the best achievements in color photography up to date. We are informed, however, that even such lame imitations as this infringe Mr. Ives' U. S. patent rights, and that he does not intend to allow any but genuine Krömskōps to be made and sold in this country, except it be as cheap toys, which can make no pretensions to giving Krömskōp results.

The Journal of the Proceedings of the Photographic Society of Philadelphia, which reprints in its pages the various papers read at the meetings and the reports of the technical and scientific sections, is a most excellent publication, and an evidence of the high position the Society holds. Nearly all the papers published thus far have been reprinted by the leading photographic magazines of Europe. By the way, we noticed recently while reading in a German photographic journal a review of the progress of photography, an account of the investigations of Dr. Caspar Miller, (a member of the Philadelphia Society), on the Per Sulphate of Ammonia Reducer. Credit was hardly given to the author, since the report omitted the proper name, and as Miller is a well known German surname as well as English,—one, ignorant of the true state of things, might imagine the credit belonged to the Teutonic instead of the American Miller.

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M. Lacour of Paris has brought out a new lens, the Eurygraph-Anastigmatic, composed of two symmetrical combinations, each of three glasses and perfectly corrected. The lenses are thicker at the sides than at the middle. With full aperture about $5\frac{1}{2}$ in. focus, the lens covers sharply a plate about 4×5 : the single combination with f-10 a 5×7 plate.

Celluloid seems to be more prone to combustion in Europe than in this country. We are every now and then hearing about serious accidents attending its manufacture and employment in the cinematograph. Recently a fire occurred at a celluloid factory in Paris, at which three fireman and several workmen were seriously injured and the property almost ruined.

The combustion was laid to the charge of the unusual hot weather which has been visiting the French capitol. But this hardly can have been the cause of the fire. We do not remember hearing the report of any serious fire from spontaneous combustion in the manufacture of celluloid in this country, and surely we have it hot enough here.

Fires which sometimes take place at exhibitions are due entirely to carelessness on the part of the operators in not taking into account the heat generated by the condensing lens of the lantern. Celluloid is, of course, very inflammable, but it takes considerable height of temperature to ignite it.

Toning Bath for Sepia and Warm Tones on Aristo Paper. Some beautiful effects of color may be obtained by using the following formula for toning and a somewhat stronger fixing bath than generally recommended with aristo paper.

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This bath will also keep a considerable time, and may be used over and over again, but care should be taken to strengthen with gold when it becomes exhausted; of course, if only a few prints are required, the quantity of gold may be reduced. With this formula any color from yellow to a rich chocolate brown may be obtained; but the exact shade is not discernible until the prints are placed on the fixing bath. When examined by *transmitted* light, the prints will appear quite a brown tone. By reflected

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lights the prints retain the purple tone, but on placing them into the hypo. in a few seconds the purple color will vanish and be replaced by a fine sepia or brown according to the length of time it has been left in the toning bath. The variety of tones obtained by this formula are most beautiful, and the bath is strongly recommended to those who are desirous of obtaining warmth of color in the finished print.

Screens which will completely absorb blue rays (but not yellow, red, or green) can be made by mixing equal volumes of a one per cent. aqueous solution of aurantia and a 20 per cent. solution of gelatine. 30 cc. of this mixture will cover 360 square cm. of surface. Screens to absorb green and yellow are made by mixing 25 parts of a 20 per cent. gelatine solution with 30 parts of a 3.2 per cent. solution of rhodamin, and spreading 30 to 50 cc. of the mixture on 360 square cm. of surface. An aurantia screen and a rhodamin screen used together with the films inside will transmit only red light. The films can be spread upon collodionised plates, stripped, and used for the construction of portable developing lamps. The rhodamin and the aurantia cannot be mixed, since in presence of the latter the rhodamin is precipitated. Rhodamin alters but little when exposed to light, and aurantia is very slightly affected by gas or lamp-light, though it gradually fades when exposed to daylight. The preparation of new screens is, however, rapid and easy. (E. Vogel, *Phot. Mitt.*)

Cathodic Rays of the Sun.—M. Deslandres has been carefully considering the possibility, first advocated by Herr Goldstein, that the sun may emit cathodic as well as luminous rays (*Bull. Soc. Astr. Fr.* October, 1898). Observations of the eclipse of 1893 (African) have led him to consider the corona as the seat of solar cathodic action. The chromosphere is an electric phenomenon, the upper parts of the chromosphere being rarefied, and emitting cathodic rays, the intensity of which is greatest above the spots and faculae. Upon this hypothesis M. Deslandres can "easily explain" the corona and its rays, the comets with their multiple tails, and the relation of the sun with terrestrial magnetism. The repulsive force of the sun is simply due to the repulsion which the cathodic primary, according to Crookes, exerts on the body on which it acts. With a small particle the attraction of the sun is proportional to its mass, but the repulsion is propor-

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tional to its surface, and might outbalance the attraction, In this way M. Deslandres suggests that the small particles occupying the high parts of the solar atmospheres are repelled by the cathodic rays of the sun, and give rise to the rays of the solar corona and to the tails of comets.—*Photography Annual*.

Beware of a Shake.—Shaking of the camera is a frequent and fatal cause of blurred images, and every precaution, therefore, should be taken against imparting the slightest movement to the camera during the exposure. A very frequent cause of vibration at the wrong moment is a tight-fitting cap to the lens. If this is taken off hurriedly—say to make a short exposure of half a second or so—a slight tremor is imparted to the camera at just the very moment when the exposure is made. The cap should fit lightly yet firmly, and the operator should be careful in taking it off to move it forwards for a couple of inches parallel with the direction of the lens. If this is done, there will be little fear of shaking, but if the cap is removed and passed upwards quickly out of the field of view, the hand is very liable to twitch the lens at the moment the cap leaves it. Careful attention to this point will save many plates.—*Photography Annual*.

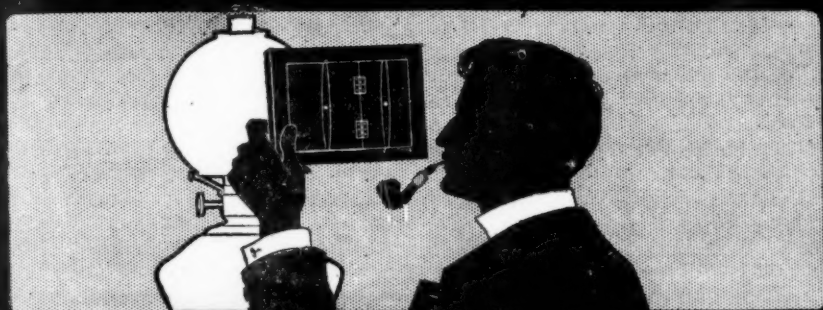
BOOKS RECEIVED

Considerations Generales sur le Portrait en Photographie; Frederic Dillaye, Paris; Gauthier Villars.

The author of this work evidently believes the photographer should possess the power to read "the minds' discernment in the face," in order to discover the best points of the subject. He touches upon the most artistic methods of lighting, the proportions of the figure, arrangement of accessories and other matters of importance in securing first-class portraiture. The book is an excellent treatise well worth attentive study.

La Photographie en Ballon et la Telephotographie; H. Meyer Heine, Paris; Gauthier Villars. This book is principally intended to discuss the value of ballon photography in military and scientific work, and is therefore very important to those interested in finding out the most approved apparatus and method of using it.

The employment of photographic kites is also touched upon.



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Have you seen " Photographic Life? " If not, send for a free copy to the Photographic Life Pub. Co., Nepera Park, N. Y.

Home Portraiture for Amateurs, by Richard Penlake, London, L. Upcott Gill.

This book is not written for the *Immature*, a designation often used synonymous with Amateur, but for those who have already entered the arcanum. Mr. Penlake writes from experience and hence all that he says must be helpful to those who are desirous of securing photographic portraits at home.

The book is further enhanced by the illustrations which are graphic comments on his remarks.

Modern Photography, in Theory and Practice. Hand-Book for the Amateur, by Henry G. Abbott ; Geo. K. Hazlitt & Co., Chicago. This book describes the various apparatus and explains the manipulations in the dark-room in a manner comprehensible by the average amateur. An important feature is in the introduction of a number of the highest grade photographs by way of illustration of processes. The printing is excellent and the binding beautiful, and the wonder is how all can be given for \$1.00.

The first of the Annuals of Photography to reach us is *Photography Annual*, for 1899, edited by R. Child Bayley, F. R. P. S., London ; Iliffe Sons & Sturmey. It is a most exhaustive summary of the year's work ; no department of the subject has been omitted and the matter in its condensed, yet pleasantly readable state, must have required much patient labor and research on the part of the Editor. The reader who is anxious to have in a convenient shape and in trustworthy detail all that is of importance to know of the progress of photography and photographic physics, should possess a copy of *Photography Annual*. Indeed our copy has already been borrowed so frequently by friends for consultation, that it is beginning to show signs of wear.

CONVENTION DATES

The International Photographic Exposition :
New York, October 21st to 28th.

Philadelphia Photographic Salon :
October 22nd to November 19th.

Indiana Association :
Indianapolis, March 6th, 7th and 8th, 1900.
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